WHAT IS CLAIMED IS:

1. An optical head device comprising:

a first laser light source that emits a first laser beam with a first wavelength;

a second laser light source that emits a second laser beam with a second wavelength which is different from that of the first laser beam;

a common objective lens that converges the first laser beam on a recording surface of a first optical recording medium and the second laser beam on a recording surface of a second optical recording medium;

a refraction surface that is formed on the common objective lens so as to be divided into a center side refraction surface region around an optical axis of the common objective lens and an outer peripheral side refraction surface region surrounding the center side refraction surface region; and

a center side diffraction grating that is formed all over the center side refraction surface region and is provided with a number of minute steps in a concentrically circular shape,

wherein a step height of the minute steps of a prescribed portion including a most inner side minute step of the center side diffraction grating is set to correspond to the first wavelength of the first laser beam, and a step height of remaining minute steps of the center side diffraction grating is set to correspond to the second wavelength of the second laser beam, and

the outer peripheral side refraction surface region of the common objective lens is formed to have a refracting power corresponding to the second laser beam.

2. The optical head device according to claim 1, wherein the minute steps of

the prescribed portion including the most inner side minute step of the center side diffraction grating are located at either three outermost steps, four outermost steps or five outermost steps, which are located in an outermost peripheral portion of the center side diffraction grating.

3. The optical head device according to claim 1, wherein the minute steps of the prescribed portion are positioned at a first step and a second step located at the most inner side minute step of the center side diffraction grating.

4. The optical head device according to claim 1, wherein the outer peripheral side refraction surface region of the common objective lens is formed to have a refracting power that is suitable to form a beam spot of the second laser beam on the recording surface of the second optical recording medium.

5. The optical head device according to claim 1, further comprising:

an outer peripheral side diffraction grating that is formed on the outer peripheral side refraction surface region and is provided with a number of minute steps that are formed in a concentrically circular shape all over the area of the outer peripheral side refraction surface region,

wherein the step height of the minute steps of the outer peripheral side diffraction grating is set to correspond to the wavelength of the second laser beam.

6. The optical head device according to claim 1, wherein a boundary portion between the center side refraction surface region and the outer peripheral side refraction surface region is located at a position corresponding to a Numerical

Aperture (NA) ranging from 0.45 to 0.55.

7. An objective lens comprising:

a refraction surface that is formed to be divided into a center side refraction surface region around an optical axis of the objective lens and an outer peripheral side refraction surface region surrounding the center side refraction surface region; and

a center side diffraction grating that is formed all over the center side refraction surface region and is provided with a number of minute steps in a concentrically circular shape,

wherein a step height of the minute steps of a prescribed portion including a most inner side minute step of the center side diffraction grating is set to correspond to a first wavelength of a first laser beam, and a step height of remaining minute steps of the center side diffraction grating is set to correspond to a second wavelength of a second laser beam having a wavelength different from the first wavelength, and

the outer peripheral side refraction surface region is formed to have a refracting power corresponding to the second laser beam.

8. The objective lens according to claim 7, wherein the minute steps of the prescribed portion including the most inner side minute step of the center side diffraction grating are located at either three outermost steps, four outermost steps or five outermost steps, which are located in an outermost peripheral portion of the center side diffraction grating.

9. The objective lens according to claim 7, wherein the minute steps of the prescribed portion are positioned at a first step and a second step located at the most inner side minute step of the center side diffraction grating.

10. The objective lens according to claim 7, wherein the outer peripheral side refraction surface region is formed to have a refracting power that is suitable to form a beam spot of the second laser beam on a recording surface of an optical recording medium.

11. The objective lens according to claim 7, further comprising:

an outer peripheral side diffraction grating that is formed on the outer peripheral side refraction surface region and is provided with a number of minute steps that are formed in a concentrically circular shape all over the area of the outer peripheral side refraction surface region,

wherein the step height of the minute steps of the outer peripheral side diffraction grating is set to correspond to the second wavelength.

12. The objective lens according to claim 7, wherein a boundary portion between the center side refraction surface region and the outer peripheral side refraction surface region is located at a position corresponding to a Numerical Aperture (NA) ranging from 0.45 to 0.55.

13. The optical head device according to claim 1, wherein the common objective lens is convex lens.

14. The optical head device according to claim 1, wherein the common objective lens includes an incident side refractive surface.

15. The objective lens according to claim 7 further comprising an incident side refractive surface.

16. The optical head device according to claim 14, wherein the incident side refractive surface has a positive power.

17. The objective lens according to claim 15, wherein the incident side refractive surface has a positive power.

18. The optical head device according to claim 1, wherein the first wavelength is 780nm.

19. The optical head device according to claim 1, wherein the second wavelength is 650nm.

20. A method of recording on or reproducing on an optical device comprising:

emitting a first laser beam with a first wavelength;

emitting a second laser beam with a second wavelength which is different from that of the first laser beam;

converging the first laser beam on a recording surface of a first optical recording medium and the second laser beam on a recording surface of a second

optical recording medium;

providing a center side refraction surface region around an optical axis of the common objective lens and an outer peripheral side refraction surface region surrounding the center side refraction surface region;

forming a center side diffraction grating all over the center side refraction surface region having a number of minute steps in a concentrically circular shape;

forming a step height of the minute steps of a prescribed portion including a most inner side minute step of the center side diffraction grating set to correspond to the first wavelength of the first laser beam, and a step height of remaining minute steps of the center side diffraction grating set to correspond to the second wavelength of the second laser beam; and

forming the outer peripheral side refraction surface region to have a refracting power corresponding to the second laser beam.